

FY-2002-2003 PROPOSED SCOPE OF WORK Project No.: 98-A  
Nonnative Fish Control: Translocation of Northern Pike from the Yampa River.

Lead Agency: Colorado State University

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4 October, 2001<sup>2</sup>

<u>Category:</u>	<u>Expected Funding</u>
<u>Source:</u>	
<input type="checkbox"/> Ongoing project	<input checked="" type="checkbox"/> Annual funds
<input checked="" type="checkbox"/> Ongoing-revised project	<input type="checkbox"/> Capital funds
<input type="checkbox"/> Requested new project	<input type="checkbox"/> Other (explain)
<input type="checkbox"/> Unsolicited proposal	

I. Title of Proposal: Nonnative Fish Control: Translocation of Northern Pike from the Yampa River in Critical Habitat.

Note: The budget for FY 02 (\$63,486) may change because 1) there is some unspent FY 01 money that may be available for FY 02; 2) the cooperative agreement between BR and CSU is currently being revised; and 3) the overhead rate may change.

II. Relationship to RIPRAP (from undated RIPRAP  
downloaded from <http://www.r6.fws.gov/crrip/rip.htm> on 10/04/01)

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<sup>1</sup> Revised based on changes suggested during conference call on 9/21/01 with T. Nesler, F. Pfeifer, K. Bestgen, R. Muth, and P. Nelson.

<sup>2</sup> Revised based on changes suggested at 9/26/01 Biology Committee meeting.

## Green River Action Plan: Yampa and Little Snake rivers

- III Reduce negative impacts of nonnative fishes and sportfish management activities (nonnative and sportfish management).
- III.A.1. Implement Yampa Basin aquatic wildlife management plan.
- III.A.1.b. Remove and translocate northern pike and other sportfish from the Yampa River.

### III. Study Background/Rationale and Hypotheses

Northern pike, *Esox lucius*, are a nonnative species that accidentally became established in the Yampa River in the early 1980s. Originally introduced as a game fish in Elkhead Reservoir in 1977, the species escaped and invaded the Yampa River via Elkhead Creek which is located about 5 miles upstream of Craig, Colorado. Since then, northern pike have established a reproducing population in the upper Yampa River and have expanded their number and range within the Yampa and Green rivers. Pike now occur throughout the Yampa River in critical habitat and in areas upstream of Craig that contain off-channel habitat suitable for their reproduction (Nesler 1995). Many large adult pike move downstream from this reach into occupied critical habitat where they pose a competitive and predatory threat to endangered Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), razorback sucker (*Xyrauchen texanus*), and bonytail (*G. elegans*). In addition, northern pike are also a significant predation threat to other "at risk" native species such as roundtail chub (*G. robusta*) and flannelmouth sucker *Catostomus latipinnis* (Martinez 1995). These "at-risk" species were included as Category 2 candidates for potential federal listing prior to revision of that system to the present candidate list, where neither species is listed.

The Recovery Program for Endangered Fishes in the Upper Colorado River Basin (Recovery Program) has determined that control of nonnative fishes is necessary for recovery of the endangered fishes in the Upper Basin. Northern pike were rated as one of six nonnative species of greatest concern by experts in the Upper Colorado River Basin based on the potential effects of pike predation on endangered and other native fishes (Hawkins and Nesler 1991). About 10% of the Colorado

pikeminnow collected in 2000 had severe injuries (bite marks) from predation attempts by northern pike. In addition, in 2000, we caught northern pike (n=443) at four times the rate that we caught Colorado pikeminnow (n=93), providing some indication of their relative number within the reach. The Colorado Division of Wildlife (CDOW) has an Aquatic Wildlife Management Plan for the Yampa River Basin (Yampa Aquatic Plan) that includes management of northern pike (CDOW 1998). Management activities in the Yampa Aquatic Plan recommend active trapping and translocation of northern pike, small-mouth bass, channel catfish, and white sucker from Critical Habitat.

Radio-telemetry and mark-recapture records of pike in the Yampa River indicate that pike use flooded backwaters and sloughs during runoff and that most pike (78%) tend to remain in one mile sections of river (Nesler 1995). Sexually mature pike are especially vulnerable to capture as they move from the main channel into off-channel spawning areas (Mann 1980). This study will implement removal of northern pike from Critical Habitat. Sampling will occur from April through June when pike are seeking off-channel habitat for spawning or for pre- and post-spawning conditioning. We will employ and enhance capture techniques proven effective for capturing northern pike in this and other Recovery Program studies. Nesler (1995) used electrofishing in conjunction with blocking the mouth of tributaries and the razorback monitoring program has used fyke nets in tributaries; both techniques were effective for capturing large numbers of pike. Previous sampling in earlier years of this study have shown our effectiveness in catching northern pike in Critical Habitat. In 1999, we sampled only backwaters in Critical Habitat using block and seine techniques and captured 72 northern pike. In 2000, we sampled in the Critical Habitat reach in both backwaters and along 75 miles of shoreline on four separate occasions. That year, we captured 443 northern pike and they were captured about equally in backwaters (n= 232) and the mainstream river (n=211). In 2001, we caught about 270 northern pike in both backwaters and the mainstream river combined. Our effort in 2001 was increased compared to the effort in 2000 and yet the number of pike captured was much less. This suggests that our removal efforts may be having an effect.

A priority in the Yampa Aquatic Plan is to reduce northern pike numbers in

the Yampa River while continuing to provide fishing opportunity for anglers. Because pike are a gamefish, their disposition is of interest to CDOW and anglers and any northern pike removed during this program will be translocated alive to locations identified by CDOW. To date, captured northern pike from Critical Habitat were relocated in 1999 to ponds on the Yampa State Wildlife Area east of Craig and in 2000 and 2001 to Rio Blanco Reservoir near Rangely, Colorado. In 2001, the CDOW reported that tag returns were good and that angler acceptance and support for the opportunity to catch quality-size northern pike from the easily accessible ponds was evident to local DOW district wildlife managers and fish biologists and participation by local anglers.

#### IV. Study Goals, Objectives, End Product:

##### Goal

The goal of this project is to improve the survival of endangered fishes in the Yampa and Green Rivers by reducing the number of adult northern pike in Critical Habitat.

##### Objectives

1. Remove juvenile and adult northern pike from critical habitat reaches in the Yampa River.
2. Relocate northern pike from the Yampa River to isolated ponds or reservoirs in or near to the Yampa Valley that conform to Nonnative Fish Stocking Procedures and are accessible to anglers.
3. Determine effectiveness of removal in terms of number and size of northern pike removed over time.

#### V. Study area:

The study site includes Critical Habitat in the Yampa River from Milk Creek (RM 120) to the head of Yampa Canyon (RM 46). This includes three reaches. The Juniper Reach is located from Milk Creek which is downstream of Craig, Colorado to Juniper Canyon (RM 120-93). The Maybell reach is located from Juniper Canyon to Cross Mountain Canyon (RM 93-64) and the Lily Park Reach is located from Cross Mountain Canyon to the entrance of Yampa Canyon (RM 64-46). Yampa Canyon is excluded because another Recovery Program project is removing nonnatives in that reach.

Sampling Dates: Removal in critical habitat will occur in spring between April and June. Actual sampling dates will be timed with runoff when flow is adequate to navigate the river for shocking and when targeted backwaters are flooded.

## VI. Study Methods/Approach

Prior to runoff, we will obtain landowner permission for access to sampling on private property. We will collect northern pike intensively in critical habitat (RM 46-120) for three or four trips, each 10-12 days long in the early spring during the runoff portion of the hydrograph. During this period, pike typically congregate along the shoreline and in off-channel habitats such as backwaters or tributaries for attempted spawning and feeding or resting. We will use sampling gears and techniques that exploit this behavior. Sampling gear will include fyke net, trammel net, seine, and electrofishing. Electrofishing and seines will be used to herd fish into the passive gears, as per "block and shock" techniques described by Nesler (1995).

The Critical Habitat Reach will be sampled primarily by electrofishing both shorelines concurrently with two electrofishing boats and with block-and-shock electrofishing at accessible backwaters or flooded tributaries.

We will start at the most upstream reach and sample the entire shoreline (both sides) and all accessible backwaters or flooded tributaries sequentially in a downstream direction, until the entire river is sampled. Off-channel backwaters will be sampled once during each sampling trip.

Each backwater in Critical Habitat will be sampled by blocking the mouth with a fyke or trammel net and then seining or electrofishing to herd fish into the capture net. Each backwater will be sampled until most (preferably all) pike are removed. In smaller backwaters this will probably require only one sampling pass and on larger backwaters it will require at least three sampling passes. All passes will be conducted on the same day. After the last sampling pass, the block nets will be removed and all fish processed. After a backwater is depleted of pike, we will continue to the next backwater and repeat the procedure.

All target species will be measured and weighed. Endangered fishes will be PIT tagged, handled, and processed as per ISMP and Recovery Program protocols. Pike will be Floy tagged to allow CDOW to track their growth and movement at the translocation site. All fishes both native and nonnative fishes will be released alive at site of capture, except northern pike. Other potentially targeted nonnative gamefish such as smallmouth bass, white sucker, and channel catfish will be handled as per instructions from the CDOW. Northern pike will be held alive in holding pens until adequate numbers are obtained for transport. If possible we will coordinate transport of pike with other crews doing similar work in other reaches. All pike will also be examined for the obvious presence of endangered fish in their throats. If endangered fish are suspected, they will be removed non-lethally from the pike if possible. Incidental mortalities of gamefish species will be examined internally for sexual condition and food contents and then returned to the river. It is not possible to safely salvage mortalities because of remote sites which lack sanitary conditions and lack suitable refrigeration. All mortalities will be reported in the annual and final reports.

Translocation sites for nonnative gamefish will be determined by the CDOW and identified in an approved Stocking Plan. The Yampa Aquatic Plan recommends translocation of northern pike, smallmouth bass, and channel catfish to locations within the Yampa Basin in order to maintain a local fishery. This project is currently planned and budgeted for capturing, handling, and transporting only northern pike. The handling protocol for transporting pike to other waters will be developed by CDOW. For the above actions to be implemented it will require that CDOW locate suitable private or public waters for translocating these fish and submit necessary stocking plans for approval by signatory state and federal agencies. Tasks outlined in this work plan and budgeted amounts were coordinated with another Scope of Work (Project 22i) that is sampling the Yampa River to obtain an abundance estimate for Colorado pikeminnow.

## Evaluation

1. Total number and biomass of northern pike removed will be reported for each backwater.
2. Catch per unit effort will be calculated to identify how many additional northern pike are captured with each

increase in sampling effort.

3. Length of northern pike captured each sampling trip will be examined to determine if the size distribution of northern pike captured changes with each successive sampling trip.

#### Expected Results

1. Removal of large numbers of northern pike from Critical Habitat in the Yampa River.
2. Translocation of northern pike to locations that are suitable for fishing.
3. Increased knowledge of pike behavior and capture efficiency so that future sampling can exploit seasonal and daily behavior.
4. Increased knowledge about the logistics and costs associated with removal and transport of northern pike.

#### VII. Task Description and Schedule

Task 1.	Jan - Mar	Contact private landowners and obtain permission for property access for fish removal sampling. Field crew training and equipment preparation.
Task 2.	Apr - Jun	Capture, remove, and translocate juvenile and adult northern pike from critical habitat reaches. 3 to 4 (12 day) sampling trips
Task 3.	Jul - Sep	Data entry and analysis. Equipment maintenance.
Task 4.	Nov-Dec	Prepare Recovery Program annual progress report for 2002 and final report for 1999-2002.

#### VIII. FY-2002 Work

Deliverables/Due Dates: (Schedule from BC meeting 9/26/01)

1. Recovery Program annual progress report: 12/10/2002
2. Draft Final Report Sent to:
  - a. Program Coordinator 11/01/2002
  - b. Peer Reviewers and Biology Committee 12/01/2002  
 Returned by Peer Review on 01/01/2003  
 Returned by Biology Com on 01/15/2003
  - c. Biology Committee for Approval 02/15/2003

#### FY-2002 Budget Estimate

Labor (5 people) . . . . .	41955
Truck Rental and Mileage . . . . .	3435
Travel (Lodging and per diem) . . . . .	5140
Supplies * . . . . .	3150
Services** . . . . .	1525
Sub-Total . . . . .	55205
Overhead: CSU rate to BR (15%) . . . . .	<u>8281</u>
Total . . . . .	63486

\* Supplies include consumable items like boat gas, boat oil, nets, and small field equipment.

\*\* Services include long distance, cell phone, and outside labor costs such as boat tune ups or welding.

#### FY-2002 Budget by Task

Task 1:	Labor	
	Biologist 1 @0.75 month . . . . .	2700
	Bio-Techs 2 @1.5 months . . . . .	4275
	Truck Rental and Mileage . . . . .	375
	Travel (Lodging and per diem) . . . . .	750
	Supplies* . . . . .	375
	<u>Services**</u> . . . . .	<u>425</u>
	Total . . . . .	8900
Tasks 2:	Labor	
	Biologist 1 @ 2.25 months . . . . .	6480
	Bio-Techs 4 @ 2.25 months . . . . .	16800
	Truck rental and Mileage . . . . .	3060
	Travel (Lodging and per diem) . . . . .	3840
	Supplies * . . . . .	2400
	<u>Services**</u> . . . . .	<u>600</u>
	Total . . . . .	33180
Task 3:	Labor	
	Biologist 1 @ 0.75 month . . . . .	2700



Bio-Techs 2 @) 1 month . . . . .	3000
Supplies * . . . . .	375
<u>Services**</u> . . . . .	<u>450</u>
Total . . . . .	6525

Task 4	Labor	
	Biologist 1 @ 1 month . . . . .	3600
	Bio-Tech 1 @ 1 month . . . . .	2400
	Travel (Researcher's Meeting) . . . . .	550
	<u>Services**</u> . . . . .	<u>50</u>
	Total . . . . .	6600

Sub-Total . . . . .	55205
CSU Overhead rate to BR (15%) . . . . .	<u>8281</u>

TOTAL . . . . . 63486

\* Supplies include consumable items like boat gas, boat oil, nets, and small field equipment.

\*\* Services include long distance, cell phone, and outside labor costs such as boat tune ups or welding.

FY-2003 Work (for multi-year study)  
FY-2003 Budget by Task

Task 1:	Labor	
	Biologist 1 @0.75 month . . . . .	3100
	Bio-Techs 2 @1.5 months . . . . .	4900
	Truck Rental and Mileage . . . . .	400
	Travel (Lodging and per diem) . . . . .	800
	Supplies* . . . . .	400
	<u>Services**</u> . . . . .	<u>500</u>
	Total . . . . .	10100

Tasks 2:	Labor	
	Biologist 1 @ 2.25 months . . . . .	7400
	Bio-Techs 4 @ 2.25 months . . . . .	19000
	Truck rental and Mileage . . . . .	3500
	Travel (Lodging and per diem) . . . . .	4400
	Supplies * . . . . .	2700
	<u>Services**</u> . . . . .	<u>700</u>
	Total . . . . .	37700

Task 3:	Labor	
	Biologist 1 @ 0.75 month . . . . .	3100
	Bio-Techs 2 @) 1 month . . . . .	3500
	Supplies * . . . . .	400

	<u>Services**</u> . . . . .	500
	<u>Total</u> . . . . .	7500
Task 4	Labor	
	Biologist 1 @ 1 month . . . . .	4100
	Bio-Tech 1 @ 1 month . . . . .	2700
	Travel (Researcher's Meeting) . . . . .	600
	<u>Services**</u> . . . . .	100
	<u>Total</u> . . . . .	7500
	Sub-Total . . . . .	62800
	CSU Overhead rate to BR (15%) . . . . .	9420
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	TOTAL . . . . .	72220

\* Supplies include consumable items like boat gas, boat oil, nets, and small field equipment.

\*\* Services include long distance, cell phone, and outside labor costs such as boat tune ups or welding.

This SOW is currently written to coordinate with Project 22i (Colorado pikeminnow abundance estimate). Since Project 22i is not scheduled in 2003, this project (#98-A) should be revised for 2003 to focus and increase pike removal efforts in areas of high pike concentrations. This increased focus and effort may require a modified SOW.

#### IX. Budget Summary

	<u>Project Cost</u>
FY-2002	\$ 63,486
FY-2003	\$ 73,000

X. Reviewers: Original (FY-99) SOW was reviewed by Ron Brunson (UDWR), Patrick Martinez (CDOW), and Chuck McAda (FWS).

#### XI. References

CDOW (Colorado Division of Wildlife). 1998. Aquatic Wildlife Management Plan: Yampa River Basin, Colorado. Colorado Division of Wildlife, Aquatic Wildlife Section, Denver.

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Colorado State University, Ft. Collins, Colorado.

Mann, R. H. K. 1980. The numbers and production of pike (*Esox lucius*) in two Dorset rivers. *Journal of Animal Ecology* 49:899-915.

Martinez, P. J. 1995. Coldwater Reservoir Ecology. Colorado Division of Wildlife Federal Aid in Fish and Wildlife Restoration Project. # F-242R-2, Job Final Report, Ft. Collins.

Nesler, T. P. 1995. Interactions between endangered fishes and introduced game fishes in the Yampa River, Colorado, 1987-1991. Final Report. Colorado River Recovery Implementation Program Project number 91-29, Federal Aid Project SE-3. Colorado Division of Wildlife, Aquatic Research Section, Ft. Collins, Colorado.

White, G. C., D. A. Anderson, K. P. Burnham, and D. L. Otis. 1982. Capture-recapture and removal methods for sampling closed populations. Los Alamos National Laboratory, LA-8787-NERP, Los Alamos, New Mexico.

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